



Attorney Reference: PBP-111-A

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant/Appellant: Bryan Prucher  
Serial Number: 10/714,328  
Filing Date: November 14, 2003  
Group Art Unit: 1725  
Examiner: Maria Alexandra Elve  
Title: METHOD OF MANUFACTURING DISPERSION  
STRENGTHENED COPPER AND/OR HYPER-  
NUCLEATED METAL MATRIX COMPOSITE  
RESISTANCE WELDING ELECTRODES

**BRIEF ON APPEAL**

Hon. Commissioner of Patents  
P.O. Box 1450  
Washington, D.C. 22313-1450

Sir:

In accordance with the provisions of Rule 1.192 please enter the following Brief on Appeal in connection with the above-identified matter:

(i) Real party in interest.

The real party in interest is the applicant Bryan Prucher.

(ii) Related appeals and interferences.

There are no other pending or related appeals and/or interferences in connection with this matter.

(iii) Status of claims.

Original claims 1-21 have been amended such that claims 4, 12, 14 and 15 have been cancelled. Thus, the remaining claims in this case are 1-3, 5-11, 13 and 16-21. At present all of these remaining claims stand rejected and are on appeal.

(iv) Status of amendments.

An amendment was filed on October 13, 2005 for which a Final Rejection was issued on April 10, 2006. An Amendment After Final was not entered by the Examiner contending that it raised new issues.

Thus for purposes of appeal, finally rejected claims 1-3, 5-11, 13 and 16-21 remain in the case.

(v) Summary of claimed subject matter.

The present invention pertains to a method of manufacturing a resistance electrode via thixamolding or cold molding wherein a powdered metal material is compacted into a preform which is thereafter sintered. The resulting preform is then finished into the electrode by cold forming or semi-solid molding i.e. thixamolding. The powdered metal is a copper-based welding alloy and includes a dispersion strengthened copper and/or hyper-nucleated metal matrix having a non-ferrous alloy powder as well as an elemental metal, such as silver, is incorporated therewith.

(vi) Grounds of Rejection.

The Examiner has finally rejected claims 1-3 and 5-7 under 35 USC 102 (a) as being anticipated by *Schimamura* et al. U.S. Patent No. 5,004,498. The Examiner has contended that this reference teaches an electrode made of dispersion strengthened copper alloy which is manufactured by sintering and reducing the alloy. The Examiner further contends that the alloying elements are disclosed by applicant as shown in the reference.

The Examiner has, also, rejected 8-11, 13 and 17 under 35 USC 103(a) as being unpatentable over *Schimamura* and further in view of *Nadkarni* et al. U.S. Patent No. 4,315,777, it being contended that the secondary reference discloses the sintering of a copper alloy. The Examiner concludes that it would have been obvious at the time of the invention to determine the requisite densities and pressures from the *Nadkarni* reference.

Claim 16 and 19-20 stand rejected under 35 USC 103(a) as being unpatentable over *Schimamura* et al. and *Nadkarni* et al., as stated above, and in further in view of Kato et al, U.S.

Patent No. 5,685,357. It is the Examiner's position that *Kato* teaches thixomolding and, therefore, it would have been obvious to combine its teachings with those of the other two references.

Claim 18 is rejected under 35 USC 103(a) as being unpatentable over *Schimamura* and *Nadkarni* and in further in view of *Prucher*, it being the Examiner's position that while primary references do not teach the use of silver in the sinter that *Prucher* does disclose a spot welding electrode which uses silver in the sintering. Therefore, the Examiner concludes it would have been obvious to include the teachings of *Prucher* with the primary references to derive the invention of claim 18.

Claim 21 is rejected under 35 USC 103(a) as being unpatentable over *Schimamura* and *Nadkarni*, *Kato* and *Prucher* and further in view of the fact that it would have been obvious to combine all of these teachings together to arrive at the invention of claim 21.

(vii) Argument.

At the outset, it is to be noted that the present invention is related to a simplified method for forming various dispersion strengthened copper products and, in particular, electrodes wherein cold forming and/or semi-solid molding is used thereby obviating multiple steps heretofore required in the prior art. For the reasons pointed out hereinbelow, it is submitted that the rejection is in error and should be withdrawn.

Specifically, and turning to the rejections, the Examiner initially rejects Claims 1-3 and 5-7 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,004,498 to *Shimamura* reference of record.

In order to anticipate an invention it is a prerequisite that each and every element of the invention, as claimed, be shown by the alleged anticipating reference. All the reference discloses is the potential of "plastic deformation" with regard to cold forming. The reference also teaches

equivalency, at Column 8, Lines 25-30, of a secondary process and/or a thermal treatment, and plastic deformation or machining. This is exactly the type of process which the present invention seeks to improve upon. There is no subsequent machining. Nor is there a subsequent thermal treatment after the pre-form is made. Rather, there is either cold forming into the final net shape or semi-solid molding into the final shape. Thus, it is believed that *Shimamura* does not anticipate the claims for its failure to teach this. Accordingly, it is respectfully requested that the rejection be withdrawn.

Next, Claims 8-11, 13 and 17 are rejected under 35 U.S.C. 103(a) over *Shimamura* and further in view of *Nadkarni*. While *Nadkarni* discloses the sintering of a copper alloy and the pressures for densifying to theoretical densities, it is submitted that this reference does not provide the deficiencies to *Shimamura* that would be prerequisite to negate patentability. Specifically, while *Nadkarni* relates to dispersion strengthening of copper and recited densities, it still does not teach the subsequent step of forming the final net shape product by either cold forming or semi-solid molding. Rather, the reference teaches that the alloy can be made. It does not teach its further processing into the final net shape by any process, be it the cold forming or the semi-solid molding as required herein. Thus, it is believed that the rejection is in error and withdrawal thereof is respectfully requested.

Next, Claims 16 and 19-20 are rejected under the same references, in the same manner cited above, and further in view of *Kato*, reference of record. It is submitted that the Examiner, in postulating this rejection, is assembling a mosaic of references in order to negate patentability. Without the interposition of the present disclosure, there is simply no suggestion in the art to combine their teachings.

It is axiomatic that in order to combine references that the suggestion for the

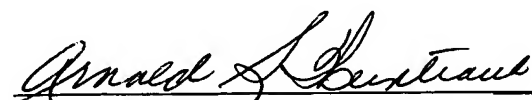
combination of same must be derived from the references themselves. None of the references even remotely hint at taking their respective teachings or portions of their respective teachings and combine same. Indeed, the same argument applies equally to the rejection of Claim 18 which the Examiner further cites the *Prucher* reference.

Nothing in the art teaches the formation of an electrode by the process defined herein. While *Shimamura* discusses a high resistance wire welding electrode, nothing in the art teaches the subject matter of Claim 18 absent the use of the present disclosure. *Prucher* in no manner teaches electrode formation by the present process. Furthermore, only the present disclosure teaches the use of silver in the pre-form and thixomolding to form an electrode. While *Prucher* appreciates the utilization of silver, nothing in the art even remotely hints at the steps of Claim 18 as well as those of Claim 16 and 19-20 without using the present disclosure for reconstructive hindsight. As to claim 21, the same argument applies. There is simply nothing other than the present disclosure and the Examiner's unsubstantiated conclusion to suggest combining their references.

### CONCLUSION

For the reasons stated, it is respectfully requested that the rejection be reversed.

Respectfully submitted,

  
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Dated: June 12, 2016

(viii) Claims appendix

1. A process of manufacturing a resistance welding electrode, comprising the steps of:
  - compacting a powdered metal material into a desired preform densified compact shape, sintering the compact shape in an inert atmosphere, and
  - shaping the resultant sintered powdered metal compact shape into its final net shaped finished electrode form by either cold forming or semi-solid molding.
2. The product produced by the process of Claim 1.
3. The process as claimed in Claim 1, wherein said powdered metal material is dispersion strengthened copper and/or a hyper-nucleated metal matrix composite.
5. The process as claimed in Claim 3, wherein said powdered metal is alloyed with a minor amount of a non-ferrous powder metal.
6. The process as claimed in Claim 5, wherein said non-ferrous powder metal is a copper-based welding alloy.
7. The process as claimed in Claim 6, wherein said copper-based welding alloy is selected from the group consisting of copper-chrome-zirconium, copper-zirconium, and beryllium-copper.
8. The process is claimed in Claim 1, wherein the step of compacting includes continuously applying a compressive force until a density of at least about 85% of theoretical density is achieved.
9. The process as claimed in Claim 8, wherein the compressive force is at least about 50,000 psi.
10. The process as claimed in Claim 1, wherein the step of sintering is carried

out at least in part at a temperature of about 1,550°F to about 1,850°F and the inert atmosphere is argon, xenon or hydrogen.

11. The process as claimed in Claim 9, wherein the step of sintering is carried out for at least about 60 minutes to about 120 minutes.

13. A method of manufacturing a resistance welding electrode, comprising the steps of:

preparing an amount of metal powder, wherein said metal powder is dispersion strengthened copper and/or a hyper-nucleated metal matrix composite,

compacting and densifying the metal powder into a pre-form having a desired shape, said compacting and densifying producing a pre-form having a density of at least 85% of theoretical density,

sintering the pre-form in an inert atmosphere, and

shaping the resultant sintered metal powder pre-form into a final net shaped finished electrode form by either cold forming or semi-solid molding.

16. The method as claimed in Claim 15, wherein the semi-solid molding process comprises thixomolding.

17. The method as claimed in Claim 13, wherein

said step of preparing an amount of metal powder includes alloying a major amount of said dispersion strengthened copper and hyper-nucleated metal matrix composite with a minor amount of other elemental non-ferrous alloy powders, and

said step of sintering is carried out at a temperature sufficient to alloy said minor and major metals into said pre-form, said sintering temperature being from about 1550°F to about 1,850°F.

18. The method as claimed in Claim 17, wherein

said minor amount of other elemental non-ferrous alloy powder is selected from the group consisting of silver and in an amount sufficient to change a desired physical property of the preform, and

said semi-solid molding process comprises thixomolding.

19. A method of making a resistance welding electrode, comprising:

providing a supply of a suitably prepared metal powder mechanically alloyed with another metal powder to introduce a second phase, compacted and sintered into a billet,

raising the temperature of the billet to a semi-solid state to form a semi-solid slurry of nearly spherical solid particles suspended in a liquid matrix, and feeding the billet into the injection chamber of an injection molding machine, and

injecting the slurry into a preheated mold to make a final net shape or a perform shape for subsequent cold forming.

20. The method as claimed in Claim 19, wherein said suitably prepared metal powder is dispersion strengthened copper and/or hyper nucleated metal matrix composite.

21. The method as claimed in Claim 19, wherein the other metal powder being mechanically alloyed for the purpose of introducing a second phase is silver.





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COMPOSITE RESISTANCE WELDING ELECTRODES  
Atty. Dkt. No.: PBP-111-A

**CERTIFICATE OF MAILING AND COVER SHEET**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Transmitted herewith is a Brief on Appeal; Certificate of Mailing and Cover Letter; and a stamped return postcard, deposited with the United States Postal Service as First Class Mail and addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this \_\_\_\_\_ day of June, 2006.

\_\_\_\_\_ No additional fee is required.

  X   Our check in the amount of \$ 250.00 is enclosed.

\_\_\_\_\_ Please charge any additional fees or credit overpayment to  
Deposit Account No. 50-2815.

  
Victoria Mendoza